

CLAIMS

1. A semiconductor light emitting device comprising:

a substrate;

5 a first GaN based semiconductor layer that is formed on the substrate and that has on top thereof a plurality of concave portions formed into a band-like shape with predetermined intervals therebetween;

a second GaN based semiconductor layer formed on
10 the first GaN based semiconductor layer;

a layered structure that is formed on the second GaN based semiconductor layer and that comprises an n-type GaN based semiconductor layer, an active layer, and a p-type GaN based semiconductor layer;

15 an n-type electrode that is formed on the n-type GaN based semiconductor layer on the portion where the layered structure is partially removed and become exposed; and

a transparent p-type electrode formed on the p-type GaN based semiconductor layer, wherein
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the p-type electrode serves as an emission detection surface, and

an air layer is formed between the bottom surface of the second GaN based semiconductor layer and the
25 concave portion.

2. A semiconductor light emitting device according to Claim 1, wherein the light emitted from the active layer reflects at the interface between the bottom surface of the second GaN based layer and the air layer.

3. A semiconductor light emitting device according to Claim 1, wherein light-shielding regions to which wiring is applied are formed on the p-type electrode and n-type electrode; and

among the plurality of concave portions, the concave portions formed beneath the emission detection surface have a width greater than the concave portions formed beneath the light-shielding regions.

4. A semiconductor light emitting device according to Claim 3, wherein the width of the concave portions formed beneath the emission detection surface is at least twice that of the concave portions formed beneath the light-shielding regions.

5. A semiconductor light emitting device according to Claim 4, wherein the width of the concave portions formed beneath the emission detection surface is

not less than 6 μm and not more than 20 μm .

6. A semiconductor light emitting device according to Claim 4, wherein the width of the concave portions formed beneath the light-shielding regions is not
5 less than 1 μm and not more than 6 μm .

7. A semiconductor light emitting device according to Claim 4, wherein the width of the projecting
10 portions formed between the concave portions that are formed beneath the light-shielding regions is not less than 1 μm and not more than 6 μm .

8. A semiconductor light emitting device
15 according to Claim 3, wherein wire bonding is applied to the light-shielding regions.

9. A method for fabricating a semiconductor light emitting device comprising the steps of:
20 forming a first GaN based semiconductor layer on a substrate;
forming a plurality of band-like concave portions on top of the first GaN based semiconductor layer with predetermined intervals therebetween;
25 forming a second GaN based semiconductor layer

by epitaxial lateral overgrowth on the projecting portions formed between the concave portions as starting points, and thereby forming an air layer between the bottom surface of the second GaN based semiconductor layer and the concave
5 portion;

forming a layered structure comprising an n-type GaN based semiconductor layer, an active layer, and a p-type GaN based semiconductor layer, on the second GaN based semiconductor layer;

10 forming an n-type electrode on the n-type GaN based semiconductor layer that is exposed by removing a portion of the layered structure; and

forming a transparent p-type electrode on the p-type GaN based semiconductor layer.

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10. A method for fabricating a semiconductor light emitting device according to Claim 9, which further comprises the step of:

forming light-shielding regions where wiring is
20 applied to the p-type electrode and n-type electrode, wherein, among the plurality of concave portions, the width of the concave portions formed beneath the emission detection surface is wider than that of the concave portions formed beneath the light-shielding regions.

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11. A method for fabricating a semiconductor light emitting device according to Claim 10, wherein wire bonding is applied to the light-shielding regions.

5 12. A method for fabricating a semiconductor light emitting device according to Claim 10, wherein the width of the concave portions formed beneath the emission detection surface is at least twice that of the concave portions formed beneath the light-shielding regions.

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13. A method for fabricating a semiconductor light emitting device according to Claim 12, wherein the width of the concave portions formed beneath the emission detection surface is not less than 6 μm and not more than
15 20 μm .

14. A method for fabricating a semiconductor light emitting device according to Claim 12, wherein the width of the concave portions formed beneath the light-
20 shielding regions is not less than 1 μm and not more than 6 μm .

15. A method for fabricating a semiconductor light emitting device according to Claim 12, wherein the
25 width of the projecting portion between the concave

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portions formed beneath the light-shielding regions is not less than 1 μm and not more than 6 μm .